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Yankee hits new milestone

Yankee nuclear power plant (Rowe, MA), the nation's oldest operating commercial nuclear generating station, hit a milestone last December 12 when it sent out its 25-billionth kWh. In June of this year, Yankee will celebrate another milestone, its silver anniversary connoting 25 years of operation. The plant, which took just 25 months to construct, was completed in June, 1960, at a total cost of $43-million or $245 per kilowatt. For its first 24 years of operation, Yankee has achieved a 74-percent capacity factor.

$750 million reserved for clean coal demo projects

WASHINGTON, D.C.——As a part of the FY 1985 continuing resolution passed by Congress last session, $750 million is being reserved in a special Treasury account for clean coal technology demonstration projects.

The Congressional action is aimed at bridging the gap believed to exist between the Reagan Administration's support for proof-of-principle research and development activities, on the one hand, and the private sector's actual commercialization efforts, on the other.

Concluding that neither the Administration nor the private sector are willing to support intermediate demonstration efforts, Congress also has legislatively directed the Department of Energy to solicit statements of interest from industry, to coordinate the responses, and to issue a report by May 1, 1985.

Details of DOE's solicitation of industry interest is contained in the November 27, 1984 *Federal Register*. The department has set a revised deadline of February 15 for receipt of proposals from industry.

According to one Senate source, the congressional action approving the $750 million expenditure is a spin-off of a bill (S. 1925) introduced by Senator Robert Byrd (D. W.VA.) in October, 1983. Byrd, from a coal-producing state, saw the acid rain debate heating up and became concerned that electric utilities might be forced subtantially to cut sulfur emissions from coal-burning power plants.

Deciding that the only ways to do this were to switch fuels from coal or to install expensive emission control apparatus, Byrd introduced the National Coal Science, Technology, and Engineering Development Act to stimulate and support research into clean coal technology. When the bill failed to reach mark-up, the alternative route of using the continuing resolution (the Congressional alternative to passing all budget bills) was implemented. A joint resolution was passed, directing DOE to take charge of the industry solicitation and funneling the $750 million authorization into a special Treasury account.

Proposal criteria

Clean coal technology demonstration proposals to DOE from the private sector are to identify and describe methods for reducing emissions from new and existing coal-burning power plants and from industrial coal uses. Such technologies should be such that they can be commercialized in the near term.

Proposals should also outline what incentives, including financial assistance, the federal government would have to provide in order to assure

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Rewriting the utility regulation 'legend'

Rapid deregulation of American industry, competitive elements introduced into the electric utility industry by the Public Utility Regulatory Policies Act, and growing belief that the traditional 'utility bargain' with its customers no longer is valid, makes electric industry regulation increasingly tenuous.

Dan Utroska
Associate Editor

LOS ANGELES—It was titled, *Public Service Regulation: The Legend Continues*. But the 96th annual convention of the National Association of Regulatory Utility Commissioners (NARUC) revealed clearly that the legend may, in fact, be diminishing to its more superficial rendering: that of "a popular myth of recent origin" (Webster).

In an era that has witnessed the deregulation of the banking and securities industries; the airlines industry; the telecommunications and trucking industries; and, in part (and possibly soon to be complete), the natural gas industry; the regulated electric utility industry appeared to some industry observers to be little more than a fading anachonism.

As noted utility economist Irwin Stelzer lightly put it, it might be possible to introduce enough competition into the residual energy regulatory structure to enable the 111th NARUC convention, slated for the year 2000, to be held in a telephone booth.

To others, however, regulation of electric utilities constitutes one of the last vestiges underlying civilized cultures.

The Public Utility Regulatory Policies Act of 1978 (PURPA) already has cut deeply into the idea that electricity generation is inherently a regulated enterprise. Providing encouragement for the development of cogenerators and small power producers who are exempt from traditional utility regulation, PURPA-drafters envisioned a host of electricity generators who are enabled to locate, build, and sell their energy according to the principles of a market economy.

Deregulation is messy, chaotic

"To the regulator . . . competition is a damned nuisance—entirely apart from the vulgar consideration that deregulation also threatens his own source of livelihood," celebrated economist and deregulation guru Alfred Kahn told the NARUC assembly. Kahn was head of the Civil Aeronautics Board when the airlines industry was deregulated.

Regulators see deregulation as such a nuisance, Kahn maintains, because it is so unpredictable and messy: under competition businesses move in and out of markets, they change their product and service offerings at will, they alter their production schedules and prices.

By contrast, the regulator is seen to prefer continuity of service and stability of prices and service offerings. "Freedom of exit is the last thing he wants," Kahn declared. "The regulator doesn't trust the market and free entry to satisfy economically legitimate demands."

Yet, Kahn's enthusiasm for deregulation, so broad that it encompasses numerous major industries, dwindles noticably as it encounters the electric utility industry.

Deregulation is feasible, Kahn says, only where competition can be stimulated in its place.

"It's a very different story in the electric utility industry," Kahn told *EL&P* in a telephone interview. "Electric utilities don't fit the mold yet."

Referring to his analyses, which he admits are very preliminary, Kahn said, "I can't figure out how to get sufficient competition to protect the public."

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Marginal cost pricing urged as premise for logical energy policy

LOS ANGELES——The use of marginal cost pricing, in both excess and boundary energy-sufficiency situations, could work to transform the current improvisational energy situation into a rational, cohesive market policy, a noted industry economist has declared.

Charging that electricity pricing historically has been little more than "*Ad hoc-ery* run wild," Irwin Stelzer told the National Association of Regulatory Utility Commissioners (NARUC) that "our goal is to make sufficient supplies of energy, in whatever form is demanded, available to all who are ready, willing and able to pay prices equal to the marginal cost of producing that energy."

Stelzer is president of the National Economic Research Associates, Inc.

'Informing principle'

Implementation of marginal cost pricing as the "informing principle" of energy policy could, Stelzer said, effectively meet challenges in such wide-ranging areas as acid rain and nuclear waste disposal; securing na-

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Foreign Power Briefs

• **China** said it will set up its first nuclear safety agency, reports *United Press International*. Wu Xing, head of China's science commission said the Bureau of Nuclear Safety will draw up safety standards and regulations for the construction of nuclear plants, issue manufacturing and operating licenses and become involved in safety research with other countries.

• **Canada's National Energy Board** (NEB) reports that nuclear power will supply 22 percent of the nation's electrical production in the year 2005. The group recently released a new report, *Canadian Energy Supply and Demand 1983-2005*.
The report projects that the use of energy by Canadian consumers is expected to grow at a rate of 1.6 percent a year. NEB said it assumes an annual GNP growth rate of 3.4 percent to 1990 and 3 percent a year from then to 2005. The report found that excess electrical capacity will exist in Quebec and Ontario, supporting imports to the U.S. NEB said that Canada's total electrical generating capacity will have to grow from 84 GW in 1983 to 150 GW in 2005 to meet the expected demand.

• **The Ivory Coast's National Electricity Company** (E.E.C.I.) has awarded NCR Corporation a $2 million contract to provide specialized equipment for decentralizing the nation's electricity payment, collections and record-keeping systems. NCR said installation of the new system begins immediately and continues through 1987. Total electrical output for the nation was two million megawatt hours in 1982.

• **Indonesia's** national power authority, Perusahaan Umum Listrik Negara (PLN) signed a $186 million contract with Babcock & Wilcox for the supply and installation of two complete 400 MW steam generation plants for the Suralaya Steam Power Plant on Java. Also involved in the contract are B&W Canada, P.T. B&W Indonesia and Marubeni Corporation. B&W Canada will have technical and commercial responsibility for the contract. Marubeni and B&W Canada are supplying the 400 MW Suralaya units 1 and 2. B&W said they will begin operation in 1984 and 1985, while units 3 and 4 are scheduled for operation in 1988 and 1989.

• **Taiwan Power Company's** Maanshan Unit 1 nuclear plant has gone into commercial operation, reports Westinghouse. The three loop, 900 MW pressurized water reactor is the first PWR to go into operation in Taiwan. The plant was completed in 74 months. Westinghouse said Taiwan Power Company is planning to order two more nuclear power plants in 1985.

• **Chichibu Cement Co. Ltd. of Japan** and Pacific Nuclear Systems have signed an agreement to bring patented Japanese nuclear waste containment technology to the United States. Pacific Nuclear will distribute Chichibu's polymer impregnated cement technology. David F. Jones, Pacific Nuclear president, said the move will provide U.S. utilities "an additional cost-effective and environmentally superior option for the storage and disposal of low-level radioactive wastes."

• **The Southwest Electric Power Administration of the People's Republic of China** and Detroit Edison's Utility Technical Services, Inc. have signed a preliminary agreement whereby UTS will provide advice on how to increase the steam generating capacity of the coal-fired Huayingshan power plant.

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EL&P readers whose responsibilities include both Generation and Transmission/Distribution receive both technology sections. Other readers receive the technology section that applies to their respective area of responsibility. The Generation edition is indicated by a single dot (•) in the upper right corner of page 1; the T/D edition carries two dots (••). All readers receive EL&P's industry news section.

Ruckelshaus resigns; Thomas named EPA head

William Ruckelshaus

Lee M. Thomas

WASHINGTON, D.C.—After serving only 18 months as administrator of the Environmental Protection Agency, William Ruckelshaus announced his resignation in late November.

President Ronald Reagan quickly nominated Lee M. Thomas, the 40-year-old EPA assistant administrator for solid waste and emergency response, to replace Ruckelshaus.

The resignation of Ruckelshaus came as a surprise to much of Washington, but the former EPA head said he felt it was time to move on.

Ruckelshaus, who was the first EPA administrator under President Richard Nixon, came back to the EPA after numerous scandals had rocked the morale and operation of the agency.

Thomas received the endorsements of Ruckelshaus and the environmental community.

Friends of the Earth spokesperson Liz Raisbeck said, "We're pleased. Thomas is a good, solid professional."

Raisbeck said Thomas's first priority should be to save the EPA budget from being cut and to increase it, if possible.

She said the environmental community is concerned that Thomas may not have as much political clout as Ruckelshaus in protecting the agency's budget.

Ruckelshaus brought Thomas to the EPA in 1983 to head the Superfund, after Rita Lavelle left under charges of perjury.

Previous to coming to EPA, Thomas worked at the Federal Energy Management Agency. He also worked for the Office of the Governor of South Carolina.

Thomas has a Master in Education degree from the University of South Carolina and a Bachelor of Arts degree from the University of the South. He and his wife have two sons.

DOE forms Coal Council

WASHINGTON, D.C.—Secretary of Energy Don Hodel said he has established a National Coal Council to provide recommendations to the Executive Branch on government-industry cooperation in coal-related matters.

The Council will be made up of between 100 and 125 members from utilities, coal companies, state and local governments, environmental, labor, user, research, academic and tribal government organizations.

DOE said the Coal Council will be patterned after the National Petroleum Council which was formed in 1946.

Said Hodel, "The Reagan Administration believes the time has come to give coal—our most abundant fossil fuel resource—the same voice within the federal government that has existed for petroleum for nearly four decades. I expect the National Coal Council to attain the same status and credibility within the coal industry that the NPC has achieved within the oil and gas community."

The Council will be responsible for assisting government and industry in determining ways to improve cooperation in areas of coal research, production, transportation, marketing and use.

NCA believes

National Coal Association President Carl E. Bagge said he believes an active coal council will help the government deal more effectively with the variety of issues directly or indirectly affecting the production and use of coal.

"Many matters relating to coal are considered by separate government agencies, some of which don't talk with one another," said Bagge. "The Council will provide a mechanism for better focusing the government's attention and bringing industry-wide expertise to bear on the most important issues."

Secretary Hodel said the initial Coal Council appointments indicate that "the Department intends to have a diverse spectrum of the highest caliber of individuals who are committed to improving the role coal can play in both our nation's and the world's energy future."

Among the electric utility representatives are: Joan Bok, chairperson of New England Electric System; James O'Connor, chairman and president of Commonwealth Edison Company; and W.S. White, Jr., chairman of American Electric Power Co.

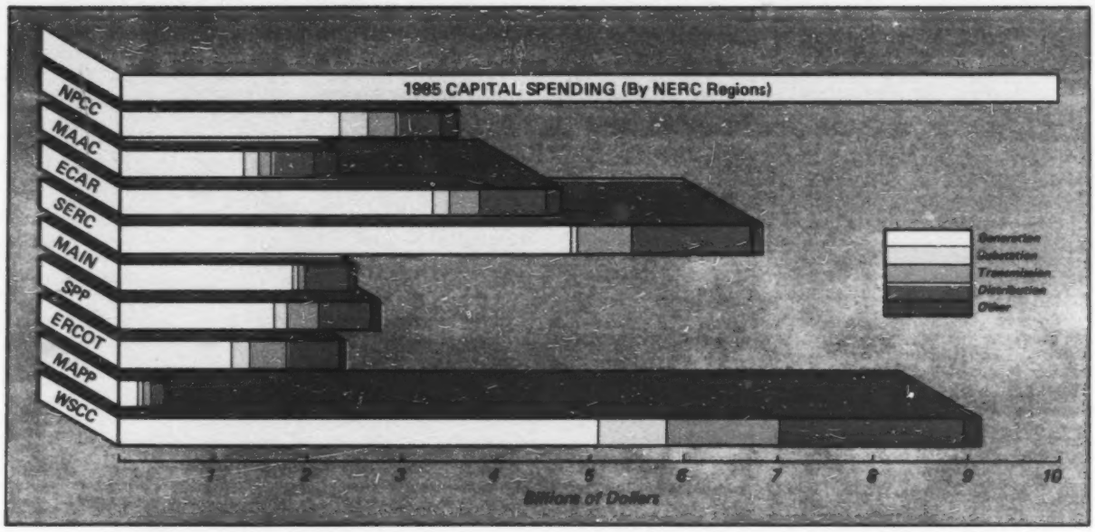
DOE said the Council's initial agenda will include such topics as the impact of federal policies on coal production, marketing, and use; the appropriate size of federal coal research and development; and coal transportation issues.

Nuclear meeting set

LYNCHBURG, VA—Topics such as fuel management, ALARA, robotics, and steam generator health care will be covered at Babcock and Wilcox's tenth nuclear operating and maintenance experience conference.

Dates announced

The company announced the meeting will be held April 17-19.



'85 capital spending to fall, financing and regulatory needs changing

Robert A. Lincicome, Editor-in-Chief
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Electric utilities will slash construction spending in 1985 and in each of the following four years as they adjust to stable demand growth and current excess generating capacity. This turnaround from the expansionary days of the last two decades, which will intensify the problems of equipment manufacturers and suppliers to the industry, will result in reduced need for external financing. Concurrently, regulators will be confronted increasingly with new questions and criteria as they seek to equate their responsibilities to power suppliers and consumers.

These are the overall conclusions resulting from *EL&P's* most recent survey of the industry, completed in late-November. Here are some of the other conclusions:

☐ Utilities will spend some $34.6-billion for new plant and facilities in 1985, reflecting a drop of nearly 10 percent from 1984 and down some 13½ percent from 1983.

☐ Construction spending will continue to decline through 1989 with the completion of the ambitious expansion plans launched in the early-and mid-1970s.

☐ As capital requirements decline, the need for new financings in the market will decline steadily until the end of the decade when most utilities will be able to generate necessary capital internally.

☐ Rates, which have climbed rapidly and steadily through the last 10 years, will stabilize and even decline in some areas over the next several years. With the exception of rates for utilities bogged down with huge nuclear plant completion costs, most rates should grow at less than the general rate of inflation.

☐ New and innovative rate structures will be more commonplace, with emphasis on providing incentives to customers to control their energy use in order that electric utilities may operate in an optimum economic manner and postpone new construction.

☐ The regulatory environment can be expected to change as new energy technologies develop and economics are altered. Other factors contributing to a changed regulatory climate are increased competition between energy sources, deregulation and greater non-regulated, diversified utility activities and recognition by regulators of the need for innovative, flexible regulation.

☐ No dramatic changes in technology will occur in 1985, but progress in several areas is expected. Chief among these are the use of coal-water mixtures as substitutes for oil in oil-fired plants, decontamination of a an operating reactor's entire primary system, HVDC transmission, distribution automation and the use of fiber optics for data transfer and control. Longer-term gains are expected in fluid-bed combustion, coal gasification, photovoltaics, plant life extension and facilities upgrading.

Late information

Electric Light & Power's investigation was launched in early October. The effort included staff contacts and interviews with industry officials, current and former regulators, financial analysts, utility managers and engineers. Industry construction expenditures were obtained by survey of some 200 electric utilities, municipal electric organizations, cooperatives and federal agencies, with the results projected to the entire industry. Last information was received the end of November.

1985 capital spending declines

According to *EL&P's* survey, electric utility organizations will spend $34.6 billion for new plant and facilities in 1985. This represents a decrease of almost 10 percent from estimated 1984 spending of $37.9 billion.

Total 1985 spending also reflects the continuing shift in spending away from heavy generation investment as the ambitious capacity-expansion programs launched in the mid 1970s come to an end. Spending for power generation, estimated to be $21.2 billion in 1985, will be about 61 percent of total capital investment. A year ago generation spending was estimated to be about 65 percent of construction spending after running above 70 percent for the previous 10 years

Generation system investment has been adjusted to allow for continued slippage in construction schedules.

At the same time, spending for substations and for transmission and distribution lines has increased proportionately, to 34.7 percent of total spending. This increase reflects greater investment by utilities to restore T&D systems to their former condition after letting system construction and maintenance slide during the years of heavy generation spending. It also is the result of recognized need to strengthen interconnections with neighboring utilities for reliability and for economy power purchases as a substitute for expensive oil-fired generation. The improvement in the growth of the housing market also is a major factor.

Investment for new substations is projected to be $2.2 billion in 1985. This is an understatement of actual spending, however, since some utilities reported substation investment as part of transmission and distribution construction plans. This also means that T&D spending is somewhat overstated.

Investment for new transmission

Continued on next page

NORTH AMERICAN ELECTRIC RELIABILITY COUNCILS	
ECAR	East Central Area Reliability Coordination Area
ERCOT	Electric Reliability Council of Texas
MAAC	Mid-Atlantic Area Council
MAIN	Mid-America Interpool Network
MAPP	Mid-Continent Area Power Pool
NPCC	Northeast Power Coordinating Council
SERC	Southeastern Electric Reliability Council
SPP	Southwest Power Pool
WSCC	Western Systems Coordinating Council

1985 CAPITAL SPENDING BY NERC REGION (CONTIGUOUS U.S. ONLY)
(In $1000's)

Region	Generation	Substations	Transmission	Distribution	Other	Total
NPCC	$ 2,461,501	$ 194,569	$ 193,027	$ 606,504	$ 100,268	$ 3,555,869
MAAC	1,265,044	155,456	105,904	476,516	272,159	2,275,079
ECAR	3,280,229	146,658	388,813	691,080	119,856	4,626,636
SERC	4,742,060	30,509	538,429	1,317,922	189,338	6,818,258
MAIN	1,876,800	49,663	77,681	445,916	71,081	2,521,141
SPP	1,677,839	138,919	355,837	568,702	79,498	2,820,795
ERCOT	1,203,714	194,380	362,934	595,323	68,334	2,424,685
MAPP	200,919	45,847	87,720	152,941	14,135	501,562
WSCC	5,046,705	605,268	1,248,464	1,936,133	256,261	9,092,831
Total	$21,754,811	$1,561,269	$3,358,809	$6,791,037	$1,170,930	$34,636,856
	%	%	%	%	%	%
NPCC	69	5	5	18	3	100
MAAC	56	7	5	21	11	100
ECAR	71	3	8	15	3	100
SERC	70	1	8	19	2	100
MAIN	74	2	3	18	3	100
SPP	59	5	13	20	3	100
ERCOT	50	8	15	25	2	100
MAPP	40	9	17	30	4	100
WSCC	56	7	14	21	2	100

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lines and facilities is projected to be $3.2 billion, reflecting a slight decline in dollars from 1984, but an increase in the proportion of total funds to be expended.

Distribution spending, projected at $6.6 billion, represents an increase both in total dollars and percentage of total investment for 1985.

Spending will be greatest in the western states and in the sunbelt states of the southeast

5-year capital spending outlook

For the 5-year period running through 1989, overall capital spending is projected to decline steadily (see table). From $34.6 billion in 1985, capital spending will decrease steadily through the period, with 1989 spending estimated to be $21.3 billion, a decrease of 38.6 percent.

Generation spending will continue to be the largest functional area of spending, representing 53 percent of total capital spending over the 5-year period. But annual spending for generation will drop steadily until in 1989 it is expected to be less than $9 billion, representing 41.9 percent of total capital spending that year, the lowest percentage since the 1960s.

The major factors in the reduction of generation investment are, as generally recognized, completion of the ambitious construction programs launched in the mid-1970s, slower-than-expected load and demand growth, resultant large generating reserves and marked reductions in future demand-growth projections.

Also a factor is the potential for substantial amounts of cogeneration capacity to come on-line as the decade comes to a close.

Spending for substations, transmission and distribution facilities over the 5-year period will total $8.6 billion, $16.5 billion and $34.3 billion respectively. This means that 5-year spending for substations will be 6.0 percent of total spending, transmission will represent 11.9 percent and distribution 24.7 percent.

Because of the shift away from generation spending over the period, spending for substations, transmission and distribution will increase proportionately, even though total dollars decline. By 1989, for example, substation construction will be 5.6 percent of total capital spending. Transmission will be 13.9 percent in 1985, while distribution will be 34.0 percent of capital spending.

The rapidly developing far western and southeastern sections of the country will be the areas where system expansion will be greatest over the 5-year period, followed by the heavily industrialized east north central states and Texas.

Shift in financing needs

In general, most electric utilities are doing quite well in terms of meeting their responsibilities to shareholders. Earnings for most companies are up substantially, again, this year. Rates of return for many companies are nearing or surpassing the limits set by their commissions.

With their ambitious construction programs ending, kilowatthour sales up as the result of greater post-recession industrial activity and slower increases in operating expenses, most utility managements are looking forward to continuing the rebuilding of strong relationships with shareholders. Overall, most utilities should enjoy an excellent financial year in 1985 and beyond.

The image of the utility industry as an industry in trouble is the unfortunate result of bad news getting the headlines. The financial misfortunes of the few companies weighed down by the excess financial requirements imposed by out-of-control nuclear projects—such as Consumers Power, Public Service of New Hampshire and Long Island Lighting—far overshadow the successes of the majority of the industry.

Fortunately, according to Mitchell Diamond, Booz-Allen principal, at the recent *Energy Daily* symposium on utility financing, "The financial markets clearly understands the difference between the majority of companies enjoying strong cash flows today and the few that are still struggling with nuclear projects."

Region	1985	1986	1987	1988	1989	Total
NPCC	$ 3,556	$ 2,647	$ 1,706	$ 1,541	$ 1,079	$ 10,529
MAAC	2,275	1,933	1,849	1,361	1,310	8,728
ECAR	4,627	3,114	3,026	3,275	2,469	16,511
SERC	6,818	7,691	5,391	4,809	3,872	28,581
MAIN	2,521	2,387	2,231	1,236	1,037	9,412
SPP	2,821	2,502	1,935	1,584	1,819	10,661
ERCOT	2,425	3,224	3,433	3,300	2,915	15,297
MAPP	502	680	589	619	835	3,225
WSCC	9,092	7,965	6,591	6,133	5,935	35,716
Total	$34,637	$32,143	$26,751	$23,858	$21,271	$138,660

	1985	1986	1987	1988	1989	5-Year Total
Generation	$21,191	$18,337	$13,732	$11,355	$ 8,913	$ 73,528
Substations	2,221	1,954	1,600	1,699	1,183	8,657
Transmission	3,196	3,630	3,395	3,349	2,951	16,521
Distribution	6,592	6,957	7,021	6,516	7,223	34,309
Other	1,437	1,265	1,003	939	1,001	5,645
Total	$34,637	$32,143	$26,751	$23,858	$21,271	$138,660

With declining construction budgets will come the opportunity for utilities to reduce the need for outside capital. Robert Burke, senior vice president of the energy division of Moody's Investors Services, Inc., says the reduction in construction expenditures will lead to less financing overall for the balance of the decade. Burke sees no pickup in construction or financing until well into the '90s.

Another who sees electric utilities' financing needs decreasing is Neal Kurzner, an analyst with Solomon Bros. Kurzner believes that utilities will finance about 65 percent of their requirements internally in 1985 and perhaps 80 percent in 1986. "I see declining construction and improved earnings for the next few years," he commented.

Pat Madden, an analyst with Duff & Phelps, believes there will be a construction hiatus until the early 1990s. His projections call for utility capital spending budgets to decline until through 1991, then begin to increase again in 1992. Through the end of this decade, he believes the industry "may be able to generate all its new capital on its own." When the need for new outside capital returns, traditional sources of funds will be used, he believes.

While the need for external funds for new construction will be small in the next 5 years, some $8.7 billion in low-interest electric utility securities will mature. These must be retired, which would adversely affect cash flow, or be rolled over, which will push the embedded cost of debt up.

Regulatory environment to change

Utility regulation is in a state of transition across the entire country and from comments of regulators, the outlook over the next few years is for more of the same. Flexibility and innovation are qualities most often mentioned as necessary to carry that transition through to an effective conclusion.

William O. Doub, former state and federal regulator, said that the challenge for innovative regulation is as much a necessity now as it was 10 years ago following the Arab oil embargo. Doub observed that "the delicate balance between the requirements of the utility and the protection of the ratepayers from unfair and unreasonable rates was acheieved with amazing success.

"Yet today, state commissions are not frankly facing up to the challenge of the nuclear regulatory problem that exists," he said. "Instead of the innovative application of regulatory techniques to solve these difficult and unprecedented problems, the response of many regulatory bodies has been to simply initiate a process of faultfinding and fault allocation. Where we should be fixing the problem, too many regulators are more interested in fixing the blame."

He suggested that under current tax laws, cancellation of some troubled nuclear plants, may appear to offer certain financial advantages. But, he declared, it is virtually impossible to conclude that these plants will not be needed in a very short number of years, given a growing population and economy.

"The price of an unadequate supply of electricity will be far greater to the consuming public and the national economy ultimately than the cost associated with the completion of [nuclear] units now in the pipeline, even if coupled with a certain amount of excess capacity in the near term," he concluded.

Raymond J. O'Connor, chairman of the Federal Energy Regulatory Commission, also called for greater creativity and innovation in the regulatory process, suggesting that regulators must recognize and understand the trends and rapid changes in the energy arena. Principle developments, he said, include the new level of competition among energy sources and the willingness of industry and other customers to seek independence from utilities. O'Connor pointed to the movement of utilities away from their traditional single service, as they get into energy services, load management, conservation, and alternative generation technologies. Another major factor affecting both supply and regulation is the move to decentralized energy potential.

One aspect of this latter development is that state PUCs "are seeking and finding a more active role in shaping the energy futures of their states," he noted. "Many have aggressively pursued conservation, wheeling, load management and alternate sources of supply in ways that are sensitive to local circumstances.

"The lines are geting blurred. Electric utilities are diversifying into non-regulated businesses and non-regulated businesses are moving into the electricity business as co-generators and small power producers."

He also commented that U.S. utility contracts for Canadian power and Canadian concerns about air pollution have made electricity an international commodity, raising a number of new issues that heretofore were beyond the scope of utility regulators.

State regulator Steven Hamm, administrator of the South Carolina Department of Consumer Affairs, speaks up for alternate methods to resolve regulatory disputes, instead of always relying on the adversarial hearing process. He said that the Edison Electric Institute has shown leadership in this area "by initiating a joint effort with representatives of several prominent consumer groups to explore new uses of negotiation to resolve conflict."

Slow technological development

No dramatic changes are in store for electric utility technology in 1985, but there are evolutionary trends that should show progress this year.

On the generation side, development is aimed at getting coal into plants burning oil or gas and at upgrading operating coal-fired plants.

A leading fuel-conversion technology for the near term is the use of coal-water mixtures as a cost-reducing substitute for oil in units designed to burn oil. Utility use of coal-water mixtures is focused on a demonstration program managed by the Electric Power Research Institute. EPRI has narrowed its choice for the demo site to seven utilities. Final choice may be announced by the end of the year. A primary goal for this year is development of a large-scale, reliable burner to handle the erosive coal water mixtures. Florida Power & Light, one of the finalists in the EPRI demo program, says it may move on its own to burn coal-water fuel in its 400-MW Sanford unit 4 as early as 1986.

Fluid-bed combustion has already moved into the demonstration phase, but it's a more complicated technology than coal-water fuel and will take longer to reach commercial adoption. EPRI estimates it will take at least another 5 years to bring atmospheric-

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pressure fluid-bed combustion to the industry on a commercial basis.

There are three large utility projects underway. Construction has begun on a 125-MW fluid-bed retrofit to a Northern States Power unit and on a new 100-MW fluid-bed plant at Colorado Ute Utilities. TVA plans to begin construction next year on a 160-MW fluid-bed boiler to be retrofitted to a unit at its Shawnee station.

Several other new coal-burning technologies are in various stages of development. For example, coal gasification is being demonstrated at the 100-MW Coolwater coalgas-burning combined cycle plant that started operating last summer. An 80-MW coalgas demonstration project is in the startup phase at Illinois Power. Other projects, such as the use of finely ground, micronized coal in oil-designed units and the retrofit of high-temperature, slagging combustors to allow burning of coal in such boilers also are underway.

Technology development for operating plants is aimed at retrofitting new hardware to improve efficiency or reliability and to extend the life of plants approaching retirement age. Utilities like Pennsylvania Power & Light and Potomac Electric Power have taken the lead in investigating the possibility of making substantial investments in old plants.

The idea is to spend several hundred dollars per kW, compared to several thousand dollars for a kilowatt of new capacity, to extend the life of plants that would otherwise be retired. PEPCO announced such a program for its Potomac River station. So far, that's the only formal life extension program announced, but many other utilities are conducting studies and 1985 should see announcement of a few more projects.

On a smaller scale, many utilities are investing in more sharply focused upgrading projects for operating plants. Hardware to improve thermal efficiency by reducing excess air required for combustion is an example. Another is replacement of old control systems with new distributed digital systems.

The concept of using modular, megawatt-scale fuel cells in utility systems will get a boost this year as construction begins on a 7.5-MW fuel cell at Southern California Edison.

New nuclear generating technology is aimed almost exclusively at improvements at operating plants. A major effort just beginning is aimed at improving the capacity factors of the 85 operating nuclear reactors.

Another trend taking hold at operating nuclear plants is the routine decontamination of radioactive subsystems to reduce maintenance costs during outages. The first decontamination of a modern operating reactor's entire primary system, including fuel, may take place this year.

Unlike aging fossil plants that are being considered for life-extension programs, aging nuclear plants are being retired and will be decommissioned in growing numbers. In 1985 the Shippingport reactor will be dismantled and removed from its site near Pittsburgh, the first major dismantlement of a commercial reactor.

Utility involvement in exotic, alternative energy sources will continue to be chiefly limited to California, where the combination of state and federal tax incentives overrides the high costs of these energy sources for non-utility investors. This year will see activity in California on wind farms, solar parks, and other exotics move forward at a lower pitch because the federal tax credits will end at the end of the year and extension appears unlikely. About 250 MW of utility-connected windfarm capacity is operating, with another 500 MW to be installed this year to beat the deadline.

Utilities remain relatively uninterested in investing in alternative energy sources because they aren't eligible for many of the tax incentives that make the investments attractive. Photovoltaic solar power, for example, holds promise for bulk power generation because of its simplicity and because advances in technology are bringing down the price. Nevertheless, electricity from a photovoltaic solar plant still costs five to ten times as much as electricity from conventional sources.

New T&D technology is gaining importance as utilities strengthen ties to neighbors, buy increasing amounts of power from distant sources, and seek to improve system reliability.

Comprehensive automation of distribution systems, for example, is being demonstrated this year by Carolina Power & Light, which is testing a variety of devices and systems on three 23-kV feeders.

EPRI is helping to bring modern electronic capabilities to transmission system protection with a demonstration of digital microprocessor-based protective relaying on the Public Service Electric & Gas Co. system.

High-voltage direct current transmission is gaining in popularity as a way to bring relatively lower-cost coal-based electricity to areas dependent on oil-fired capacity or areas facing a shortage of capacity. Suppliers say the market potential is for as much as 20 GW of new HVDC power transfer capacity, in addition to the 12 GW now in operation or under construction.

Another transmission related technology development of interest is the concept of using composite ground wires with fiber-optic data transmission capability operating over utility rights-of-way. The high data transfer capacity of fiber optic lines opens up the possibility of utilities diversifying into a new business area: selling bulk data transfer services. Utilities such as AEP and South Carolina Electric & Gas are installing prototype systems to see how they work.

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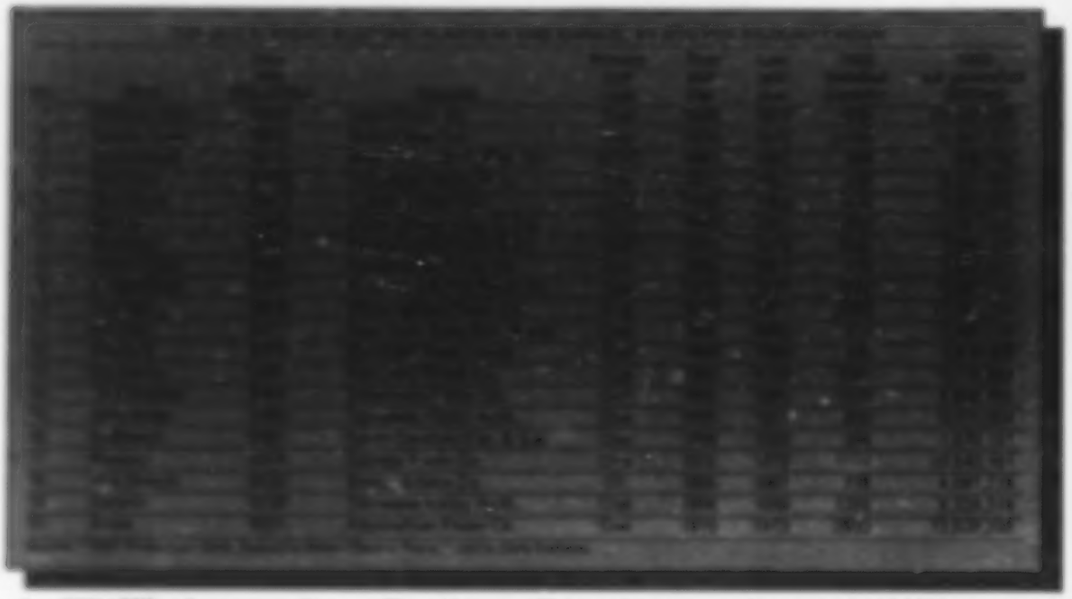
Most efficient, lowest cost plants identified



WASHINGTON—Duke Power operated the most efficient steam-electric generating stations in 1992 and West Texas Utilities and Gulf States Utilities operated the stations with the lowest production costs, according to data in the latest production cost report by Utility Data Institute, Inc.

The report includes 1992 production expenses, fuel expenses, electrical generation, and thermal efficiency on a plant-by-plant basis for 644 large (over 200 MW) steam-electric stations. The group accounted for 90 percent of the total steam-electric generation in 1992. The total includes 332 coal-fired plants, 167 gas-fired, 66 oil-fired, 69 nuclear, three combined-cycle, one petroleum-coke-fired, and one geothermal station.

There are separate tables ranking the top 100 in three different categories: by total generation, by production expenses, and by heat rate. It is important to note that the data cover multi-unit plants, not individual units. The primary fuel for multi-fuel plants is noted but the fuel cost for all fuels is reported.

Of the top 100 plants ranked by output, 69 were primarily coal-fired averaging 9.11 million MWhr of generation in 1992 each, 20 were nuclear plants averaging 8.65 million MWhr, 9 were gas-fired averaging 6.03 million MWhr, and 2 were oil-fired averaging 6.41 million MWhr. The plant with the highest output in country was Detroit Edison's coal-fired Monroe station with a 1992 installed capacity of 3014 MW and net generation of 19.3 million MWhrs.

Of the top 100 plants ranked by production cost, 60 were coal-fired with an average production expense of 15.72 $/net MWhr, 32 were nuclear averaging 12.62 $/net MWhr, and 8 were gas-fired averaging 9.97 $/MWhr. These costs do not include a capital component.

The 100 most efficient plants include 76 coal plants, 12 oil plants, 11 gas, and one combined cycle. The top 20 are shown in the table. Nuclear plants were excluded from the table by UDI because of "variability" in reporting methods.

A fourth table lists data for all 644 plants including fuel expense. Average fuel expense for all the coal-fired plants was 16.33 $/MWhr, average for all the gas-fired plants was 36.07 $/MWhr, average for all the oil plants was 49.66 $/MWhr, and average fuel expense for the nuclear units was 5.95 $/MWhr.

"1992 Production Costs, Operating Steam Electric Plants," is available from UDI at 2011 I St. NW, Washington DC 20006. It costs $150.

Balsam Meadow tunneling continues

After "shotcreting" the blasted out crown portion of the 13,000-ft. underground powerhouse, workmen continue to drill and blast another 40 feet downward to form the "breadloaf" shaped chamber 1,000 ft. below surface for Southern California Edison Company's Balsam Meadow Hydroelectric Power Project in the Sierra Nevada mountains. When completed in late fall 1997, 600 feet the 600+ million underground hydro facility will add 200 MW of capacity to Edison's Big Creek hydroelectric complex.

NRC study says nuclear power plant experience lessons being forgotten

WASHINGTON—It's not unusual for nuclear power plants to experience a total loss of safety systems—it happened 120 times in the U.S. in the last three years—and there are continuing problems with the ability of utilities to learn from such experiences, according to a recent NRC report.

The study was published by NRC's Office for Analysis and Evaluation of Operational Data and it contains some unfavorable judgments about the learning ability of utilities operating nuclear plants.

For example, the report says "...at times, repetitive events occur which indicate that corrective actions taken at the individual plants are not as long-lasting or as effective as anticipated, and the lessons of experience seem to be sometimes lost or forgotten with time."

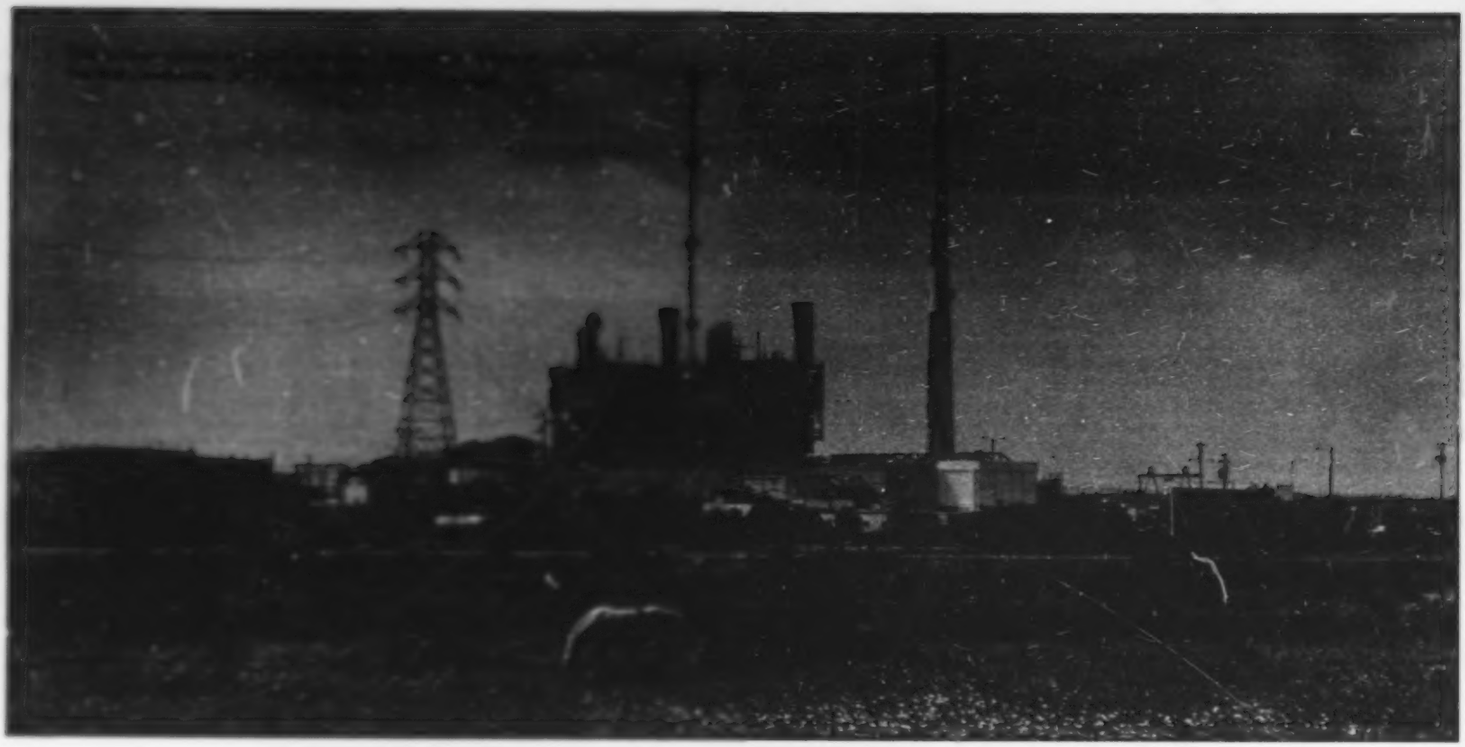
It stresses the importance of learning from experience because serious incidents such as total loss of a safety system are not rare at nuclear plants. "Operating experience continues to indicate...that a total loss of safety system function is not a rare event. For example, during January, 1994, a total of 7 actual failures of safety systems were reported. Further, over the past three years or so, a total of more than 120 total losses of safety system function have been identified by AEOD. Most events (70 percent) were caused by human factor-related causes. The systems most frequently affected were those associated with decay heat removal, containment spray, and ECCS."

Failures of safety systems are significant because they are frequently challenged: "Studies...show a frequent challenge rate to emergency equipment. For example, the reactor trip frequency during 1993 was about 0.3 trips/plant/year. In the month of January, 1994, a total of 39 scrams were reported. The principal causes of these scrams were component failures and personnel errors."

There were judgments in the NRC study about the quality of reports from operating plants. One said that these reports, and industry learning practices in general, are "much improved" over the pre-TMI practice but another comment was aimed at recent poor performance: "In the past, studies—particularly trends and patterns analyses—have been severely hampered by the nonuniformity and incompleteness of licensee reports. The new LER rule, which became effective on January 1, 1984, should help correct many of these problems..."

Overexposure of workers to radiation continues to be a problem, says the report. The number of incidents are small, it adds, but they are avoidable.

The report contained recommendations for action by NRC's regulatory branches to remedy the problems.



Nuclear power industry begins decommissioning old reactors

Robert Smock
Managing Editor

The nuclear industry is reaching retirement age. It now faces the problem of decommissioning its veteran nuclear power plants.

About half the commercial power reactors put on line in the '50s and '60s have reached the end of their lives already. The U.S. Department of Energy says 20 more units are expected to be "eligible" for decommissioning during the next 15 years.

One of the retired veterans, Shippingport, is slated for a formal decommissioning featuring a costly dismantlement and removal of all structures. Others, like PG&E's Humboldt Bay, are being decommissioned but are merely being closed for the time being. Still others, like Commonwealth Edison's Dresden 1 and Consolidated Edison's Indian Point 1 have been retired; a decision on formal decommissioning is being put off.

Other veterans like Yankee Rowe, Big Rock Point, Haddam Neck, and Monticello are still running strong, but in the words of a DOE official, they're "getting old."

Dan Williams, a member of the Atomic Industrial Forum's committee on decommissioning and a member of Arkansas Power & Light's nuclear operations division, told a recent nuclear meeting in Chicago that a full-scale decommissioning of a modern, large nuclear unit would cost from $140 million to $170 million.

According to Williams, the industry is not starting at zero to develop decommissioning techniques. "Nuclear plant decommissioning is an assured commercial industrial endeavor, not a research and development project."

To date, 68 nuclear reactors have been decommissioned, counting small research and experimental reactors, Williams said. That includes 9 small, non-commercial power reactors of which five were mothballed, three "entombed", and one dismantled.

DOE, says Williams, has published a handbook describing decommissioning techniques, such as concrete and metal structure removal, and the federal agency plans to publish a report early this year that will help utilities estimate the cost of decommissioning a specific unit.

The Shippingport project will bring decommissioning "to the brink of commercialization," according to Williams. He says that past projects have helped develop techniques but they've been relatively small scale. For example, the dismantlement of the Elk River experimental reactor, the largest dismantlement project to date, produced about 128,000 cubic feet of concrete waste. A typical commerical sized PWR, says Williams, has 4.5 million cubic feet of concrete.

Tearing down Shippingport

According to DOE, which owns the Shippingport reactor, little of the past work on decommissioning has demonstrated the techniques planned for this project.

Shippingport is a 72-MW PWR first operated in 1957. It was shut down in 1977 for conversion to operate as a light-water breeder, operated for three years in that mode, then stopped operating for good in 1982. Fuel was removed last summer and decommissioning activities started.

The goal is to return the site to "unrestricted" use. The plan is to "greenfield it," explains Franklin Coffman, director of DOE's office of waste disposal. Everything in the nuclear reactor part of the plant—the part DOE owns—will be removed.

Three feet of clean dirt on top of a clean rubble bed will be all that's left.

Continued on page 22

PREVIOUSLY DECOMMISSIONED REACTORS

Reactor	Mode of decommissioning	Date of decommissioning
Hallam Nuclear Power Facility	Entombment	1968
Piqua Nuclear Power Facility	Entombment	1969
BONUS	Entombment	1970
Elk River	Dismantlement	1974
Peach Bottom	Safe storage	1978
Los Alamos Molten Plutonium Reactor Experiment	Dismantlement	1980
SRE (Sodium)	Dismantlement	1982

Source: DOE

POWER REACTORS ELIGIBLE FOR DECOMMISSIONING
Reactor Vessel Characteristics

Plant	Power (MWe)	Vessel size	Wall thickness	Activity (curies)	Weight (tons)	Comm. ops.	Type	Power generated ($MWhr \times 10^6$)
Elk River	22.5	D=7.5' H=28'	3"	1.0×10^3	<90	1964	BWR	0.4
Shippingport	72	D=10.5' H=35'	8.4"	1.2×10^4	218	1957	PWR	7
Indian Point #1	265	D=10' H=33'	7"	3.5×10^6	225	1962	PWR	30
Humbolt Bay	65	D=10' H=40.5'	8"	N.A.	159	1963	BWR	5
Dresden 1	207	D=13' H=41'	5.5"sides 9"bottom	N.A.	–	1960	BWR	17
Yankee Rowe	175	D=10.5' H=31.5'	8"	N.A.	150	1961	PWR	24
Big Rock Point	64	D=9.7' H=30'	5.3"	N.A.	120	1963	BWR	7
Haddam Neck	582	D=13' H=42'	10.6"	N.A.	–	1968	PWR	59
Monticello	545	D=17' H=63'	5"	N.A.	–	1971	BWR	39*
Oyster Creek	650	D=18' H=64'	7.3"	N.A.	–	1969	BWR	44*
San Onofre	436	D=12' H=37'	9.8"	N.A.	–	1968	PWR	37*
Nine Mile Point	620	–	7"	N.A.	–	1969	BWR	43*
Vermont Yankee	514	D=17' H=63'	5"	N.A.	–	1972	BWR	31*

*As of early 1982
Source: DOE

If the barge carrying the reactor sinks in the Panama Canal "we'll probably have a cost overrun."

when the decommissioning project is completed in 1988, says Coffman. Uncontaminated underground structures will remain three feet below grade.

Unrestricted use is defined by DOE, says Coffman, to mean that less than 170 millirem/yr is contributed to the food chain. Vegetables can be raised at the site, says the official.

The project is estimated to cost $80 million in 1986 dollars. That's a lot compared to the original, 1957 price tag for the plant of $121 million. But, says Coffman, it's only about 10 percent of the 1986 replacement cost of that much capacity.

There were cheaper options than dismantlement, says Coffman. DOE could have just locked the door and walked away. Surveillance would have cost about $250,000 a year. Another option was to entomb the radioactive facilities by encasing them in a massive concrete structure.

One of the reasons DOE chose immediate dismantlement was its relationship with Duquesne Light. The utility owns the site and the non-nuclear facilities and has a lease agreement with DOE that expires in 1994. The site of Duquesne Light's Beaver Valley nuclear station is adjacent to the Shippingport site. According to DOE, the utility has made it clear that the only method of decommissioning acceptable to it is prompt dismantlement.

One-piece removal

A striking feature of the Shippingport dismantlement plan is the decision to remove the reactor vessel in one piece instead of cutting it up. The vessel, which is 35 feet high and 10.5 feet in diameter, will be filled with other radioactive components.

The 770-ton shielded package plus other radwastes from the project will be put on a crawler, hauled to the nearby Ohio River, and put on a barge. The package will be barged via the Ohio River, Mississippi River, and the Panama Canal to DOE's Hanford site in the state of Washington where it will be buried.

A major reason for choosing one-piece removal is the "institutional nightmare" of sending 80 loads of waste to Hanford by truck, Coffman explained. The single barge shipment will be able to handle all the waste.

The DOE decision was influenced by their experience with getting the waste out of the West Valley reprocessing facility, which DOE is currently cleaning up. Trucking out the radioactive material has been a "nontrivial" problem, said Coffman. DOE worried that some state or community would shut down the $80 million project. Coffman added that segmented removal of Shippingport structures would have raised project cost by $7 million.

Asked what happens if the barge sinks in the Panama Canal, Coffman said, "We'll probably have a cost overrun." He explained that a crane would be built and the load would be lifted out and set on the canal bank. The package, he added, is designed not to leak. He said it would be no more a problem than the UF_6 shipment that sunk in the North Sea recently. It can be dealt with, said Coffman, as long as it doesn't go off the Continental Shelf.

Asked if one-piece removal is applicable to larger reactor vessels, Coffman said it probably isn't. He noted that newer vessels are much larger than Shippingport's and that modern plants contain several orders of magnitude more radiation. He said DOE went with one-piece shipment, even though it may not be useful for larger plants, to reduce complexity and keep costs down.

Cooling off Dresden

Another major retirement-related project currently underway is the decontamination of Dresden 1.

Commonwealth Edison is not formally decommissioning Dresden 1 but has announced the unit is being retired and will not be operated again. Dresden 1 is the commercial prototype for boiling water reactors. It is a 200-MW unit first operated in 1960. It was operated successfully until 1978 when it was shut down for major modifications.

The accident at TMI occurred during the outage and the utility estimated the cost of bringing Dresden 1 into compliance with the post-TMI regs at $300 million. It did not want to spend that much on the reactor and it has not operated since then. Last August Commonwealth Edison announced the unit would be retired.

While the unit was still operating in the early '70s Commonwealth Edison had decided to decontaminate its entire primary system—an unusual step for a U.S. power reactor (see EL&P, November, 1984, page 42.) The decision was made because of the high radiation fields that were interfering with normal maintenance.

In a recent speech, David Harmer, president of the decontamination contractor for the project, IT Nuclear Services, said, "By that point in time (the 1978 shutdown), the various in-service inspections had been delayed to the point where it was no longer possible to run the reactor further until decontamination was completed."

The primary side decontamination was one of the major steps planned for the outage that was overtaken by events, including the decision not to operate the reactor any more. Objections by intervenors and delays imposed by the Nuclear Regulatory Commission, such as the requirement for an environmental impact statement, led Commonwealth Edison to put off the decision to proceed with the decontamination project in the early '80s.

However, the utility had already invested $50 million in the project, including $8 million from DOE. Most of it was for construction of a permanent decon facility at the Dresden site. The idea was to use it for periodic decontaminations of all three reactors there. A considerable amount of money and effort was also devoted to studies of the effect of the decontamination solvent on the materials at Dresden 1.

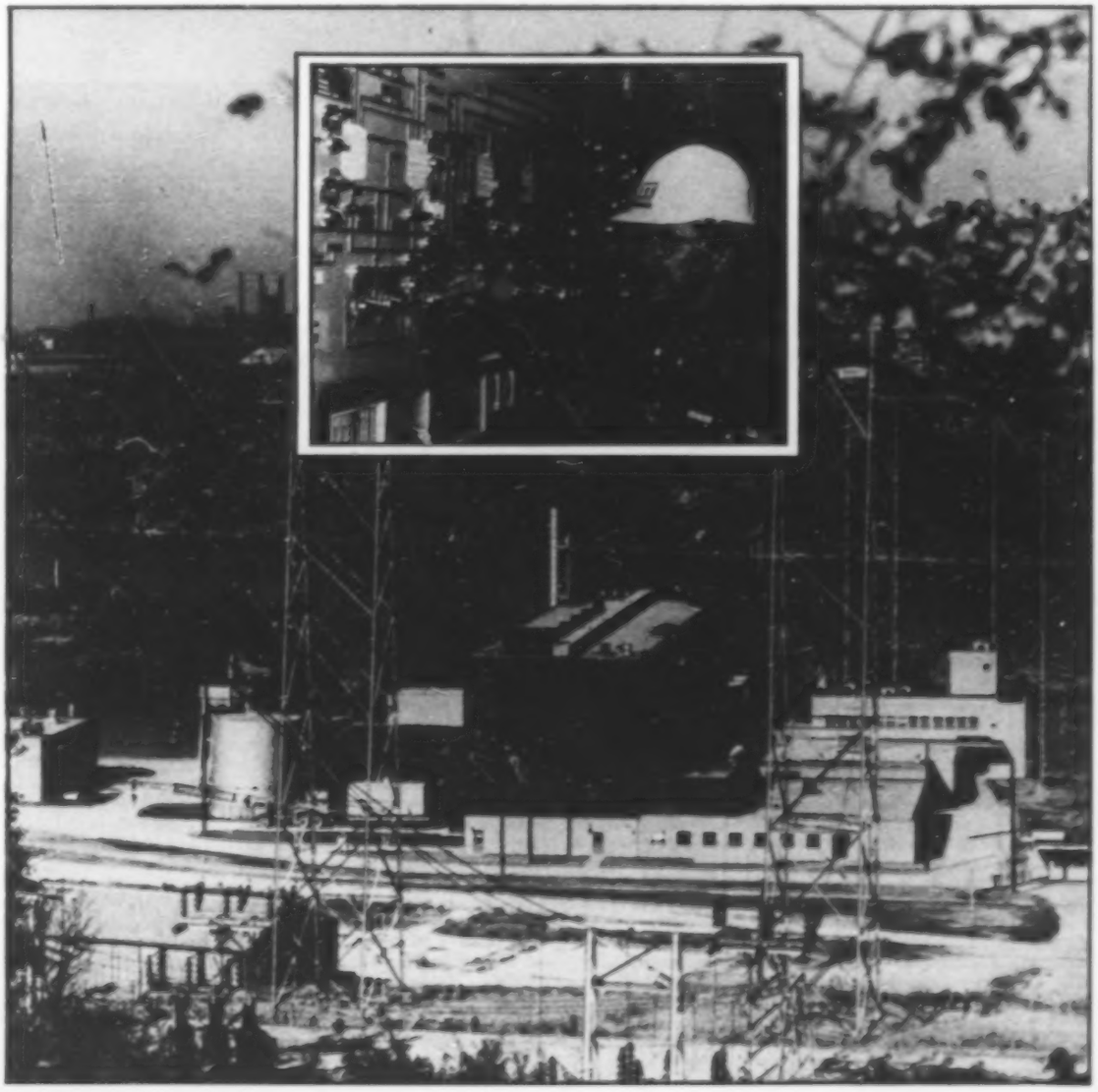
As a result Commonwealth Edison revived the decon project last year. The goal of the project now is to demonstrate the effectiveness of using a concentrated solvent on the primary side of a reactor and to serve as a preliminary step in the planned mothballing of the unit.

Irene Johnson, former project engineer in the program and currently working in Commonwealth Edison's communications department, said a decontamination factor of from 100 to 1000 was desired.

Johnson pointed out that Dresden 1

Continued on page 33

DOE has already begun the decommissioning process for the Shippingport reactor near Pittsburgh (below). Commonwealth Edison built a decontamination facility (inset) for its Dresden station where unit 1 is being retired.



Decommissioning . . . from page 22

has an unusual design for a BWR. It has a steam drum and steam generator loops. However, only the primary side of the system was decontaminated. Fuel was removed in 1978.

Last September 95,000 gallons of concentrated solvent (called NS-1) was pumped through the system, followed by rinses. The cleaning and flushing process took 100 hours, at a temperature of 255F.

The decontamination was more effective than expected, said Johnson. A total of 726 curies of Cobalt-60, the chief contaminant, came out in the decon solution; 667 curies had been expected. "We're very happy overall with the results," said Johnson.

The cleaning and flushing solutions were stored in two 250,000-gallon tanks on site. The radwaste will end up in the form of solidified ion-exchange resins in 55-gallon drums. A total of 468 drums will be buried at the Hanford site.

Johnson said there are still questions about future steps to be taken with Dresden 1. It's not being decommissioned because the site is still in use—the operating license for the newest unit, Dresden 3, doesn't expire until 2003. Now that it's clean Dresden 1 will get some kind of caretaking which hasn't been exactly defined yet.

"Safstor" for Humboldt Bay

A third alternative has been chosen for Pacific Gas & Electric's veteran Humboldt Bay unit 3. Shut down since 1976, the reactor will be put into a "safstor" condition for 30 years, then dismantled.

The 63-MW nuclear unit operated from 1963 to 1976 when it was shut down for seismic modifications. It never operated again and PG&E recently announced that it would be officially decommissioned.

The utility has applied to the NRC for a license amendment and in the meantime is preparing the reactor for the 30-year cold storage phase. Fuel was removed from the core last March and put in the on-site pool. Plant facilities are being decontaminated "to the extent practical to minimize the potential for spread of contamination outside of the facility and to minimize the requirements for periodic surveys," according to a recent presentation to the NRC by decommissioning project manager, Terry Nelson.

Plant systems are being flushed and drained. Radwastes are being processed and will be shipped out for burial. Nelson estimated the project would require about 100 low-level radwaste shipments.

Activities necessary to put the plant into cold storage are expected to be completed by the end of the year. The plant will then be guarded and monitored for an estimated 30 years when fuel will be removed from the site and final action taken.

Several other small power reactors have been shut down permanently. Peach Bottom 1, for example, was formally decommissioned like Humboldt Bay 3 and Shippingport will be. Indian Point 1, like Dresden 1, is just being defueled and permanently retired from service for the time being.

Premature decommissioning

The foregoing are reactors that were voluntarily removed from service by their owners because it was felt they had reached the end of their lives. There's another type of decommissioning, "premature decommissioning", that deserves a look.

The accident at Three Mile Island unit 2 produced the most recent, and most hope, the last example of premature decommissioning of a nuclear unit.

Franklin Coffman, the DOE official in charge of the decommissioning work at Shippingport and West Valley, also oversees the agency's interest in the TMI-2 cleanup and described it at a recent American Nuclear Society conference. He noted that advances in cleanup and decontamination procedures developed at TMI, the extensive use of robots is a good example, will help all utilities in their future decommissioning activities.

Coffman reported that radioactive contamination of porous cinder block and concrete surfaces at TMI is re-

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Decommissioning options, costs

The Atomic Industrial Forum reports that NRC regulations define three acceptable forms of decommissioning.

Mothballing, or safe storage, requires that the fuel be removed and the facility placed in "a state of protective storage with continuing confinement of radioactive materials so that the risk to the public is minimized and within acceptable radiation protection limits." Security and monitoring are required. Cheapest of the options, AIF estimates the costs (in 1980 dollars) at $3 million to $12 million for a PWR and $3.5 million to $20 million for a BWR.

Entombment requires that the fuel be removed and all highly radioactive components such as the reactor vessel sealed in "a protective structure of concrete or other high integrity material." Again, security and monitoring measures are required. Cost is estimated to range from $6.5 million to $41 million for a PWR and $11 to $38 million for a BWR.

Dismantlement requires that everything radioactive be demolished and removed from the site, permitting unrestricted use of the property. Cost is set at $24 to $102 million for a PWR and from $29 to $122 million for a BWR.

Combinations of the options may be acceptable, says AIF.

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NERC drops growth forecast to 2.5%/yr

HOUSTON—The National Electric Reliability Council's 10-year forecast rate for peak demand growth has declined for the tenth straight year, according to a report by the organization's engineering director David Nevius and publications manager Blaine Vincent made at the Coal Technology Conference.

In 1974 NERC's member utilities forecast a peak demand growth rate for the next ten years of 7.6 percent per year. As the realities of the following decade set in that forecast rate steadily declined. In its latest summary of utility forecasts, NERC shows an expected growth rate in peak demand for the period 1984-1993 of 2.5 percent per year, which is about what it actually was for the past ten years. Energy requirements are expected to grow at an average rate of 2.7 percent per year for the next 10 years, slightly below the actual growth rate for the last 10 years.

"This scenario," reported Nevius and Vincent, "is based, one must be cautioned, on the trend of the past ten years. But trends can change, as we have seen. If and when our current decade-long trend actually starts to change, all bets are off."

Noting the 5 percent growth in electrical energy consumption in 1984 over 1983, the NERC analysts said it's too early to tell if it's indicative of a new trend which would make the latest forecast too low. "Careful forecasters," said the analysts, "are witholding judgment for a few more quarters to watch developments."

They noted that NERC's forecast is finally in the middle of the other forecasts. It has traditionally been on the high side.

NERC's members expect capacity to grow at a rate of only 1.8 percent per year through 1993. If summer peak demand does climb 25 percent above the 1983 level to 559,000 MW as expected, 1983's 35 percent reserve margin will drop to about 28 percent.

Overall, generating capacity is expected to rise by 130,000 MW during the next ten years. Of that total 85 percent will be coal-fired and nuclear capacity. Utilities plan to add 55,000 MW of nuclear capacity (average unit size is 1100 MW) between now and the early 1990s after which nuclear capacity additions stop. Coal-fired plants to be added over the next ten years total 56,000 MW (average unit size is 526 MW.)

Total generation is expected to rise by 30 percent to reach 3 million GWhr in 1993. Coal's share of 1993 generation is forecast to drop slightly to 54.6 percent from 1984's 55.9 percent. Even though its share drops a bit, total coal consumption by utilitites is expected to grow 27.7 percent, from 646 million tons in 1984 to 826 million tons in 1993.

Conversion of capacity currently burning oil to burn coal is expected to account for 10 percent of the growth in coal consumption. Close to 6000 MW of capacity is slated for conversion, 70 percent of which is in New England or New York.

Nuclear's share of 1993 generation is expected to rise sharply to 23.6 percent of the total from 1984's 15.9 percent. The share for oil and gas combined is expected to drop to 25.8 percent in 1993 from 1984's 32.2 percent. Hydro's share is also expected to drop slightly to 9.4 percent from 10.4 percent in 1984.

Utilities also plan to add 26,000 miles to the existing 132,000 miles of bulk power transmission networks.

TVA director calls for acid rain action

KNOXVILLE, TN—Legislative action should be taken to control acid rain, urged Tennessee Valley Authority Director John B. Waters before members of an environmental group in Nashville.

Waters said, "I am satisfied that there is sufficient evidence of a causal connection between fossil fuels and acid depostion to warrant further restraints on sulfur emissions, and I hope that Congress will take appropriate action."

He said that absolute certainty about causes and effects of environmental problems comes "only when our resources are absolutely destroyed."

Citing apparent acid rain-related damage to forests in West Germany and lakes in Scandanavia, Waters said that we can't "wait until our own forests are blighted and our lakes are dying before we take steps to protect them."

He said TVA has shown that sulfur pollution control can be achieved.

Decommissioning ...

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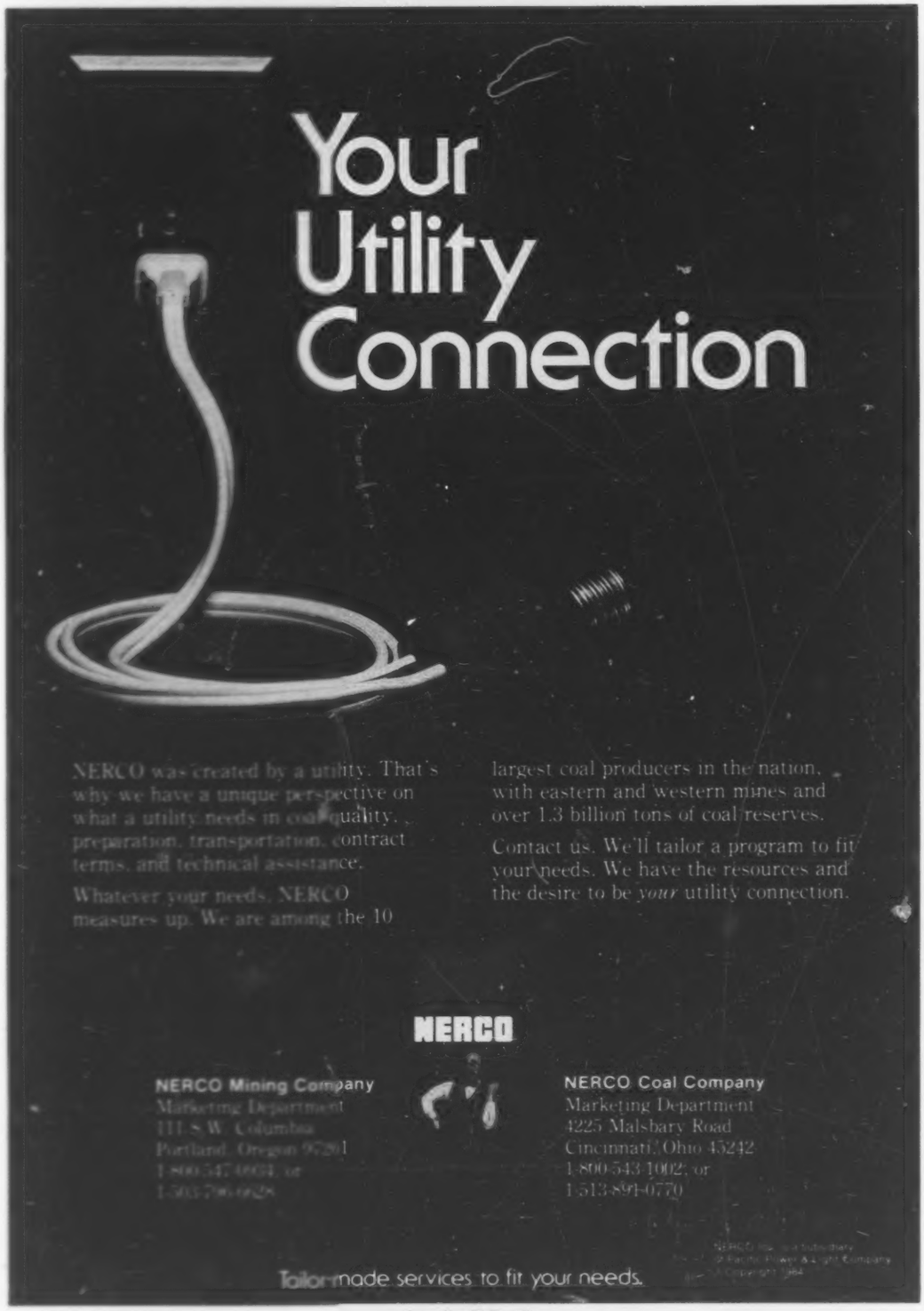
quiring an enormous effort to remove the top layer of concrete. None of the concrete was sealed or painted, he said, adding, "There ought to be a message there."

The porous cinder block walls at the bottom of the plant structure are the hottest areas remaining, at about 1000 R/hr. About 75 percent of the reactor building surfaces have been decontaminated so far.

Present schedules call for removal of the damaged core in 1987. The plan is to package the 300,000 lb of core material in canisters and ship it to Idaho for storage, pending final disposal in the geologic repository to be built by the federal government.

Cleanup funds are currently being spent at the rate of about $100 million a year. The total effort is estimated to cost $760 million. The unit cost about $700 million to build.

However, TMI-2 aside, decommissioning appears to be a manageable issue for utilities. The older reactors are being taken out of service and decommissioned in an orderly way at what appears to be, so far, a reasonable cost.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